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# ACTIVATED CAESIUM FLUORIDE – A RADIOTRACER STUDY

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Treatment of CsF with $(CF_3)_2CO$ in the presence of MeCN followed by thermal decomposition of the 1:1 adduct formed is one of the methods used to 'activate' CsF for use as a heterogeneous catalyst or reagent. We have compared $^{85}Kr$ adsorption at activated and untreated CsF and compared reactions of these materials with radiochemically labelled Lewis acids in order to quantify the activation effect.

Activated CsF has a B.E.T. surface area in the range 3.01 - 2.08 $m^2g^{-1}$ (95% confidence limits) compared with 0.3 $m^2g^{-1}$ for untreated CsF. Room temperature $^{18}F$ exchange between activated CsF and $BF_2{}^{18}F$ or $AsF_4{}^{18}F$ is not observed, but reaction to give $BF_3{}^{18}F^-$ or $AsF_5{}^{18}F^-$ is rapid, and, in the case of $BF_3{}^{18}F^-$, complete. Uptake of $AsF_4{}^{18}F$ by CsF is smaller due to sintering. $CsBF_4$ prepared by this means undergoes no observable room temperature $^{18}F$ exchange with $BF_2{}^{18}F$, but $^{18}F$ exchange between $BF_3$ and $BF_4^-$ in MeCN is rapid and complete. Uptakes of $BF_2{}^{18}F$ and $AsF_4{}^{18}F$ by untreated CsF are far smaller, reflecting the smaller surface area; the extent of these reactions is comparable to that between activated CsF and the weaker Lewis acid $SF_3{}^{18}F$. No room temperature $^{18}F$ exchange is observed but $^{18}F$ and $^{35}S$ experiments enable surface adsorption and bulk reaction to be differentiated. 15% of the surface species are strongly adsorbed $SF_5^-$ anions. The remainder are weakly adsorbed $SF_4$ molecules.